Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Flexible lead-free cruciform piezo-arrays for implantable wireless energy harvesting on complex surfaces

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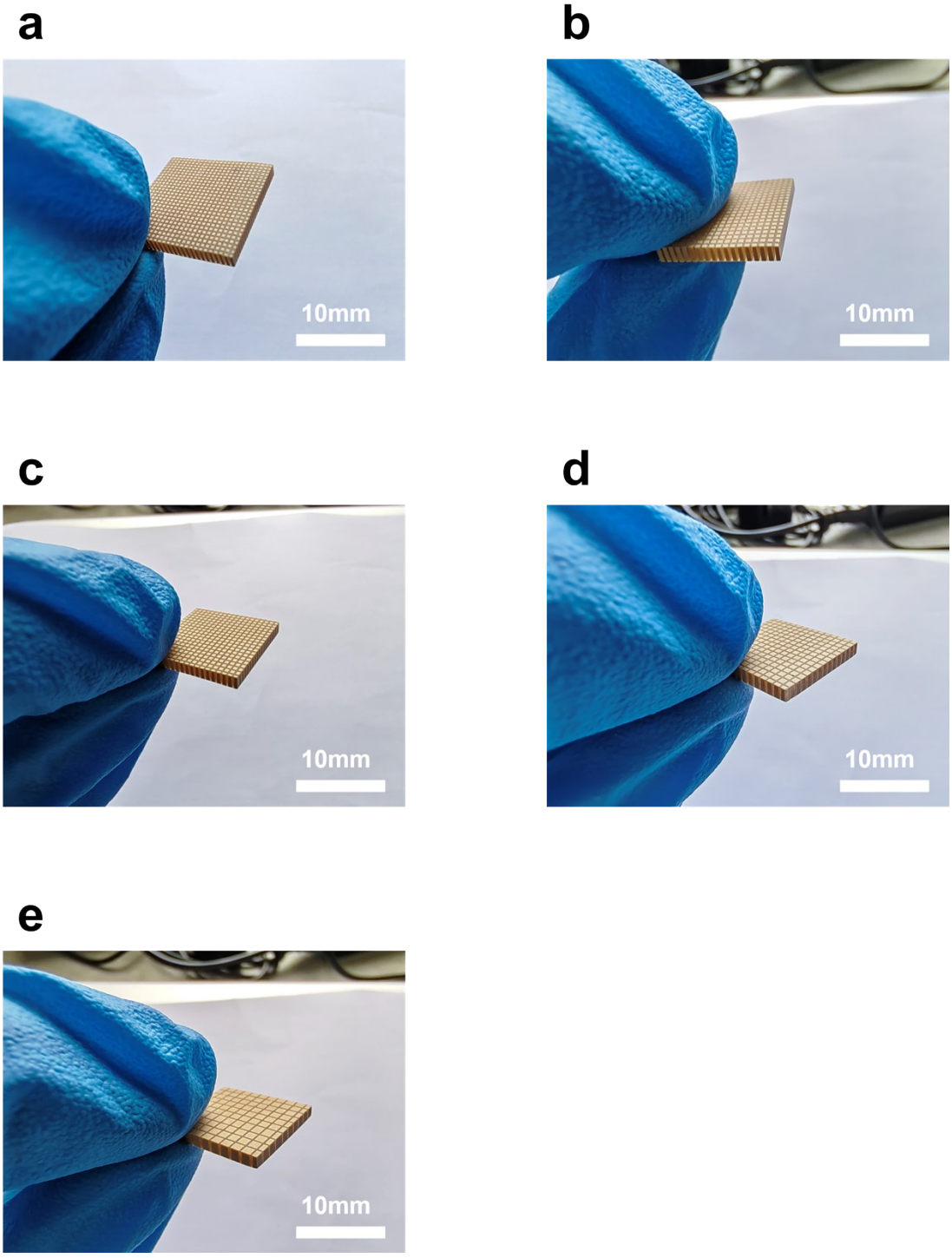

Figure S1 KNN-based 1-3 composites at different dicing distances (ceramic volume fraction). (a) is 0.5 mm; (b) is 0.6 mm; (d) is 0.7 mm; (b) is 0.9 mm; (e) is 1.3 mm.

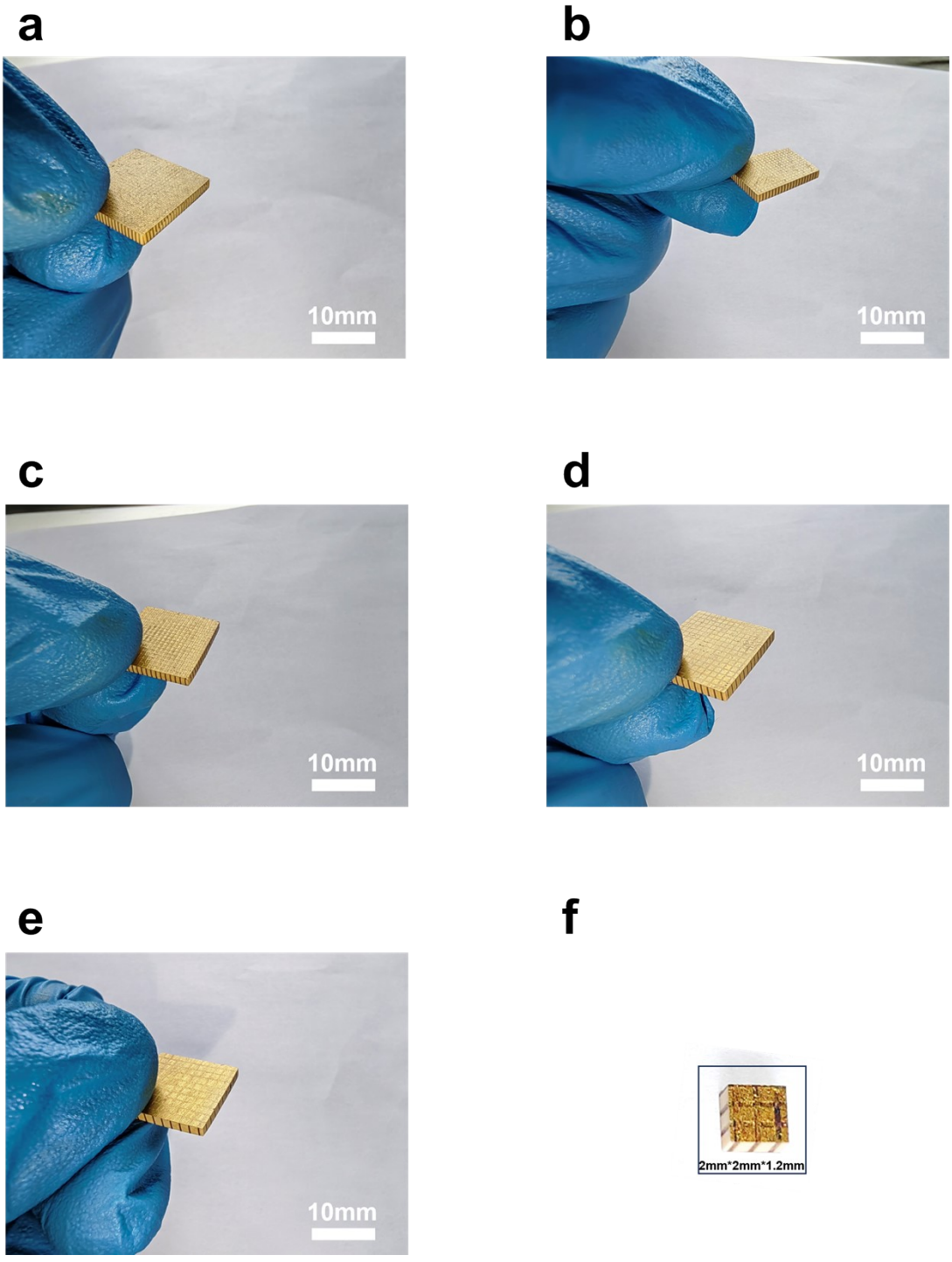

Figure S2 KNN-based 1-3 composites plated with gold electrodes. (a) is 0.5 mm; (b) is 0.6 mm; (d) is 0.7 mm; (b) is 0.9 mm; (e) is 1.3 mm; (f) KNN-based piezocomposite unit.

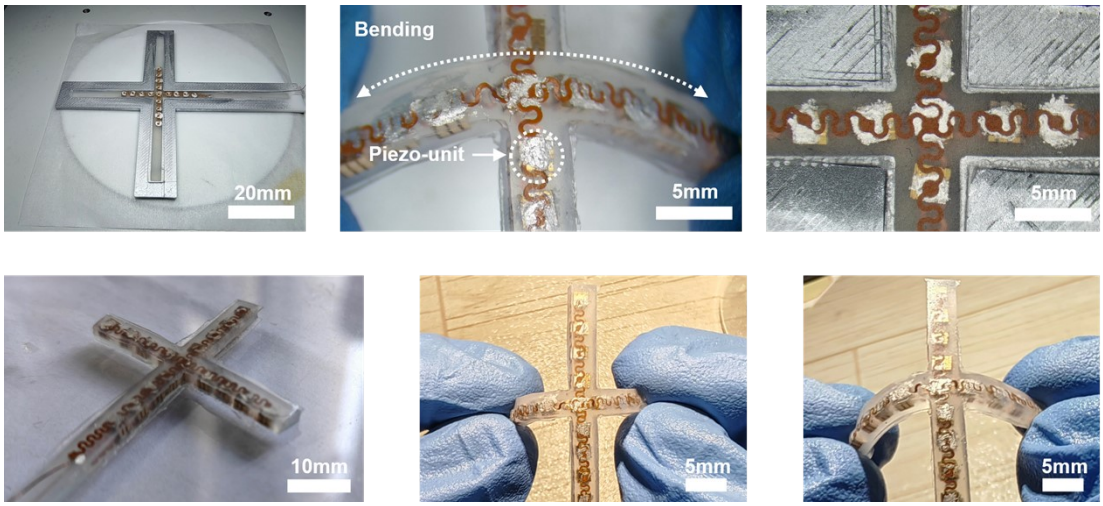

Figure S3 Flexible cruciform ultrasonic device.

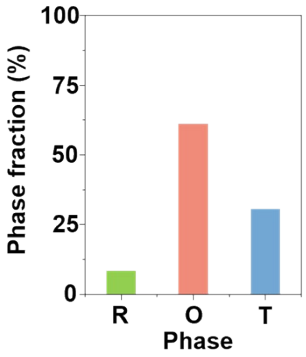

Figure S4 Phase fraction of each phase of KNN-based ceramics.

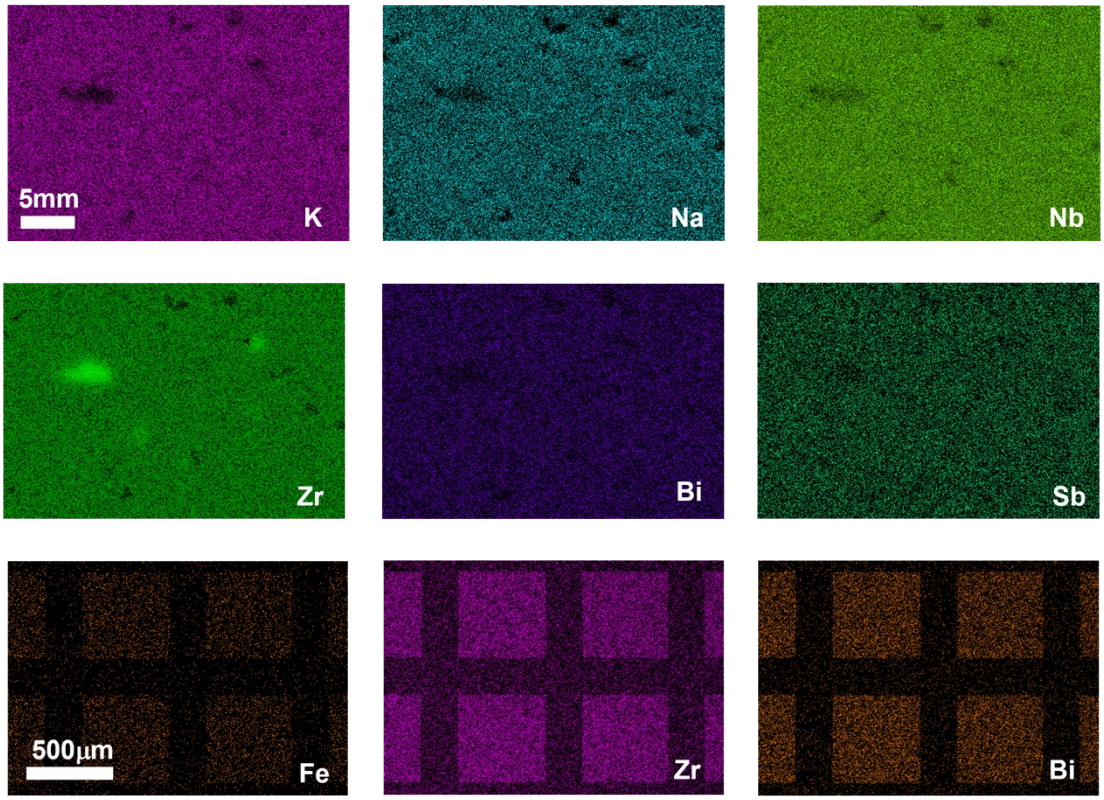

Figure S5 Corresponding element mapping results of KNN-based ceramic and 1-3 composites

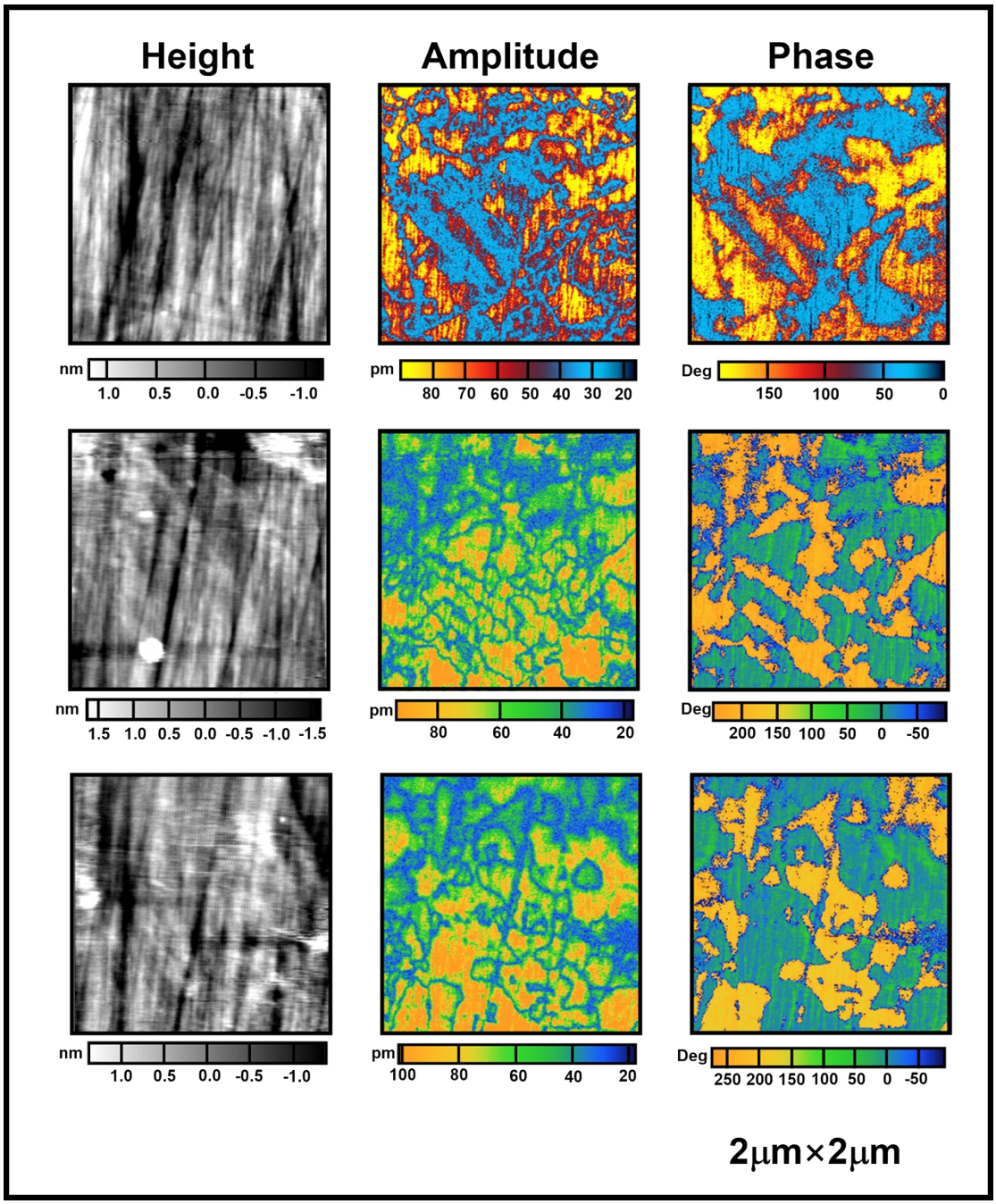

Figure S6 PFM characterization.

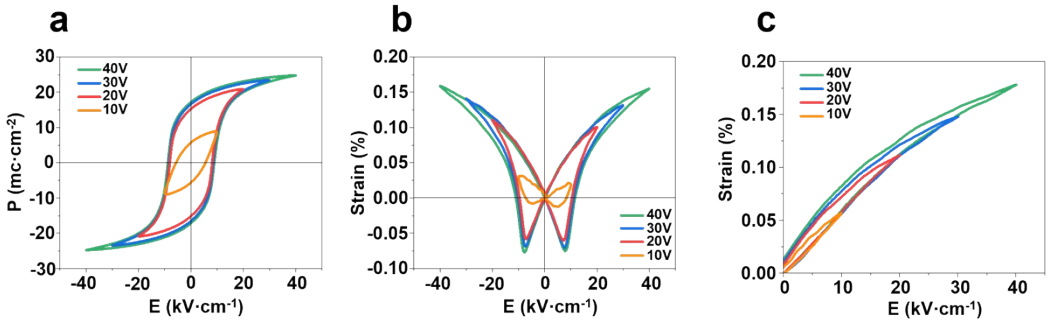

Figure S7 Ferroelectric and strain curves. (a) P–E loops of the dense ceramic. (b) Bipolar strain curves of the dense ceramic. (c) Unipolar strain curves of the dense ceramic.

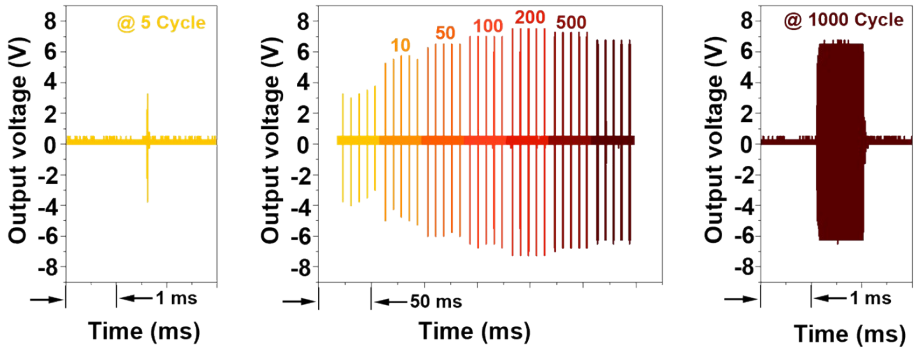

Figure S8 Characterizations of the output voltage. A Output voltage signal of the device measured at different cycles. Ultrasound-induced energy transmission can be regulated by setting trigger cycles.

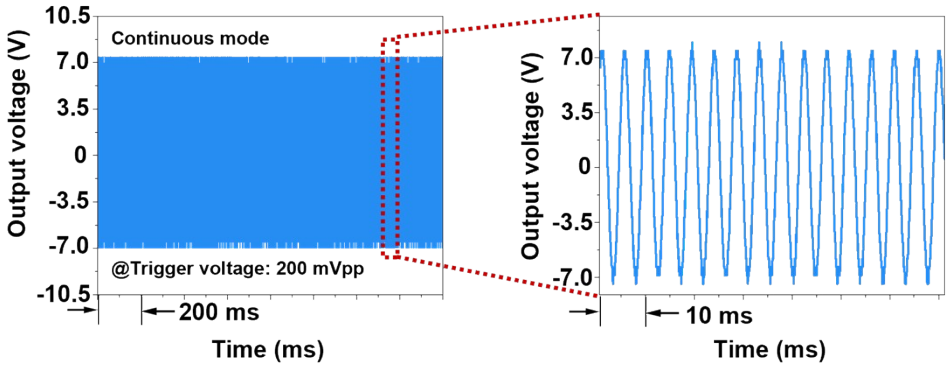

Figure S9 Output voltage in a continuous mode. (a) and (b) Characterizations of the output voltage of the device when the input voltage is 200 mVpp in a continuous mode. A continuous 200 mVpp 200 kHz sinusoidal signal was switched to drive the ultrasonic transmitter, generating a continuous sinusoidal signal, indicating the output signals are purely induced by the piezoelectric effect of the device.

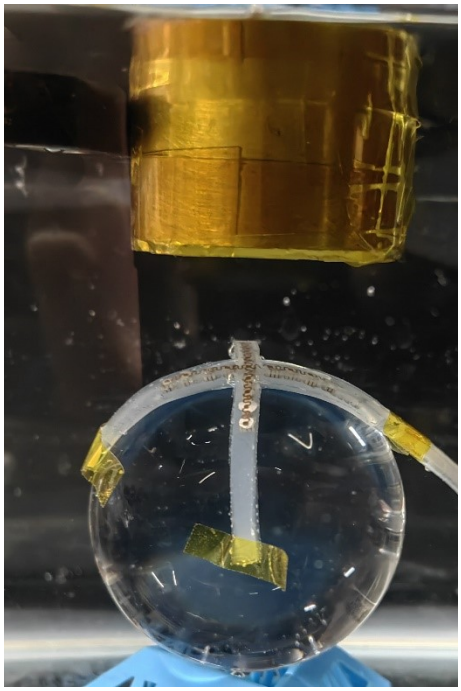

Figure S10 Schematic diagram of ultrasonic testing in the spherical surface.